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1. Introduction

A wide variety of industries makes use of granulation processes – from pharmaceuticals and foods to minerals processing and agriculture [1,2]. Granulation can be considered the agglomeration of powder by a liquid binder [1–8]. The binder may be polymeric, where polymers are often used to hold particles together [1,2,6]. Granulation is often considered the result of three processes: nucleation and binder distribution; consolidation and growth; and attrition and breakage [1–3,5–7,9–13]. For the purposes of the research presented here, attrition and breakage of pre-formed agglomerates is of interest, with a goal of addressing the lack of detailed understanding of this unique mechanism [1,5,12,14]. Generally, breakage refers to wet granules, while attrition is associated with dry granules [13]. The primary failure modes in wet granulation are plastic and brittle [9]. When plastic failure occurs, the material may deform with no major crack formation and no peak stress development during stress-strain analysis [9,15]. The material may be described as flowing like a paste or smearing [9,13,15]. Brittle failure occurs after a major crack forms; a peak flow stress will clearly be present [9,15]. In either scenario, the deformation or failure is not recoverable [9,16].

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